

# Materials Advances

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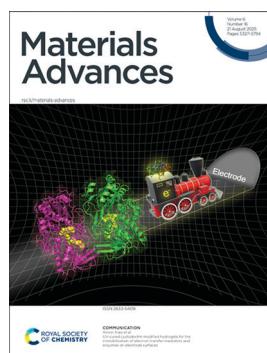
## IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 6(16) 5327–5794 (2025)



### Cover

See Junji Murata et al., pp. 5424–5438.  
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### Inside cover

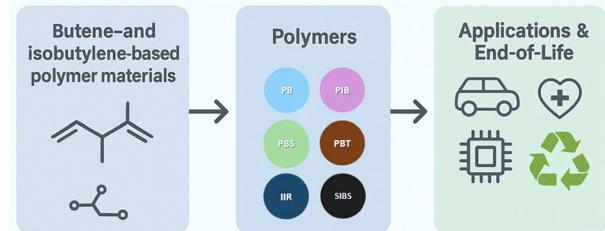
See Xinxin Xiao et al., pp. 5419–5423.  
Image reproduced by permission of Xinxin Xiao from *Mater. Adv.*, 2025, 6, 5419.

## REVIEWS

5339

### Polybutene, polyisobutylene, and beyond: a comprehensive review of synthesis to sustainability

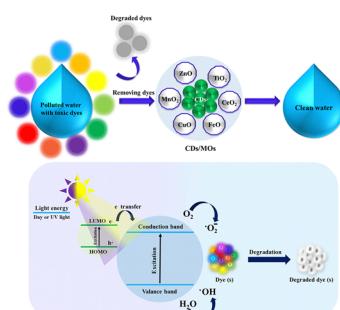
J. I. Mnyango,\* B. Nyoni, N. Mama, B. G. Fouada-Mbanga, Z. Tywabi-Ngeva and S. P. Hlangothi\*



5391

### Dyes and their toxicity: removal from wastewater using carbon dots/metal oxides as hybrid materials: a review

Kawan F. Kayani,\* Sewara J. Mohammed, Muhammad S. Mustafa and Shujahadeen B. Aziz



# Environmental Science: Atmospheres

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Fundamental questions  
Elemental answers

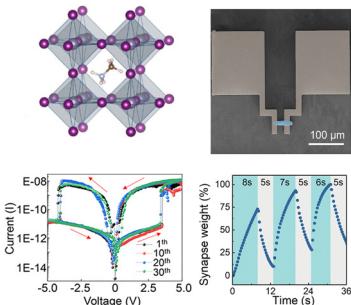


## HIGHLIGHT

5410

**Single crystal halide perovskites for resistive switching memory devices and artificial synapse**

Hyojung Kim

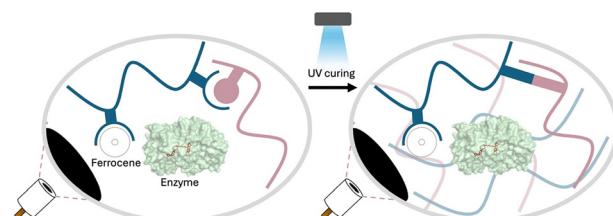


## COMMUNICATION

5419

**UV-cured cyclodextrin modified hydrogels for the immobilization of electron transfer mediators and enzymes on electrode surfaces**

Johanne Stagsted Kristensen, Ruiqi Jing, Qiuyue Peng, Thorbjørn Terndrup Nielsen, Emil Riis Wolfhagen, Junjun Tan, Kim Lambertsen Larsen and Xinxin Xiao\*

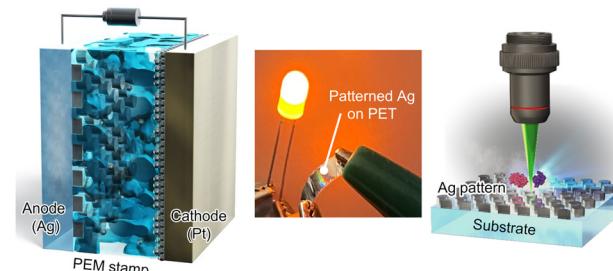


## PAPERS

5424

**Maskless soft lithography for fabricating micro- and nano-scale Ag structures via solid-state electrochemical etching using a polymer electrolyte membrane for optoelectronic and sensing applications**

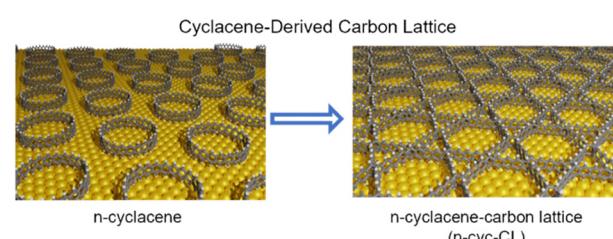
Tatsuya Fujii, Daishi Hakozaiki, Atsuki Tsuji, Masaru Takizawa and Junji Murata\*



5439

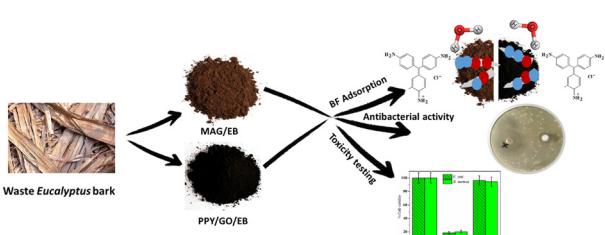
**Cyclacene-derived carbon lattices with distorted hexagonal tiling and in-plane  $\pi$ -orbitals: coexistence of flat and Dirac bands**

Divanshu Gupta, Michael Mastalerz, J. Michael Gottfried and Holger F. Bettinger\*



## PAPERS

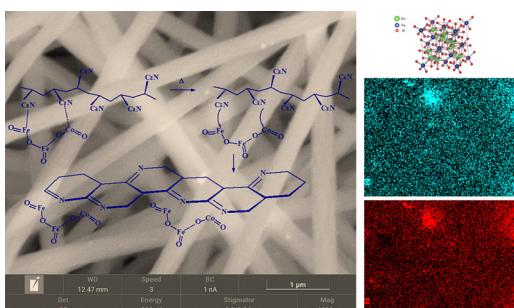
5449



### CuFe<sub>2</sub>O<sub>4</sub>/EB and PPY/GO/EB materials for the removal of basic fuchsin from wastewater: kinetic, equilibrium and thermodynamic studies

Muhammad Ahsan Rashid, Mahwish Iqbal, Sidra Perveen, Haq Nawaz Bhatti,\* Fatimah M. Alzahrani and Munawar Iqbal\*

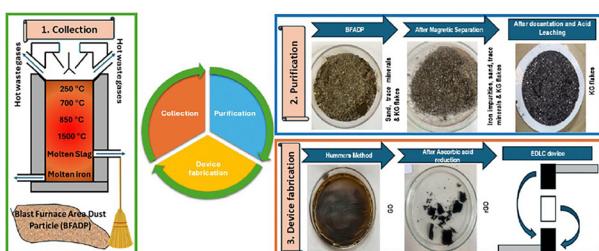
5475



### Impact of thermal treatment and magnetic field on the dynamic mechanical behavior of polyacrylonitrile nanofibers with embedded magnetic ferrite nanoparticles

Baran Sarac, Viktor Sopruncuk, Eray Yuce, Selin Gümrukçü, Wilfried Schranz\* and A. Sezai Sarac

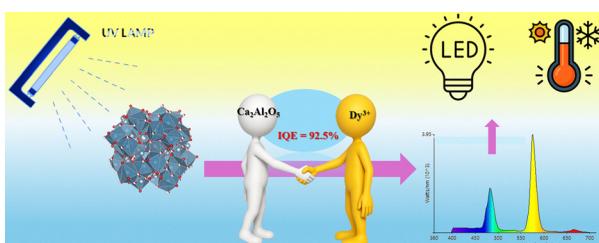
5486



### From steel waste to energy storage: kish graphite derived graphene electrodes for high performance supercapacitors

Ankitha Rao, Somashekara Bhat,\* Shounak De, Adarsh Rag S and Vipin Cyriac

5506



### Insights into structural, luminescence and temperature-dependent emission characteristics of $\text{Ca}_2\text{Al}_2\text{O}_5:\text{Dy}^{3+}$ phosphors for advanced lighting applications

A. Vidya Saraswathi, Tejas, S. Masilla Moses Kennedy, A. Princy, M. I. Sayyed, Aljawhara H. Almuqrin, Vikash Mishra and Sudha D. Kamath\*



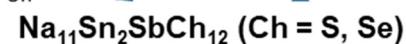
## PAPERS

5523

## Design strategies for liquid-phase synthesis of sodium-based quaternary solid-state electrolytes

Saeed Ahmadi Vaselabadi,\* Brynn Benham and Colin A. Wolden

## Protic Solvents



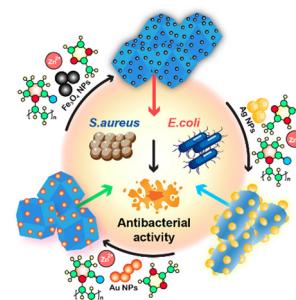
## Amine-Thiol



5538

## Preparation of ZIF-8-based nanocomposites and their notable antibacterial activities

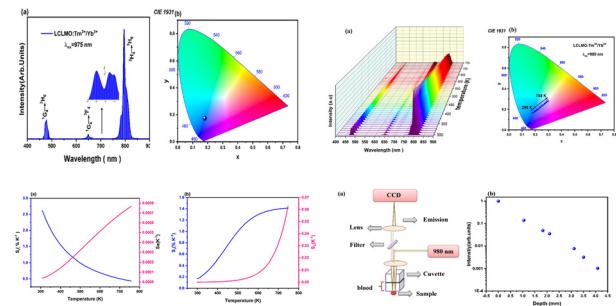
Le Hong Tho, Do Thao Anh, Hanh Kieu Thi Ta, Bang Thang Phan, Sungkyun Park, Seyoung Kwon, Kieu The Loan Trinh and Nhu Hoa Thi Tran\*



5546

Dual-functional  $\text{Tm}^{3+}/\text{Yb}^{3+}$ -doped  $\text{LiCaLa}(\text{MoO}_4)_3$  phosphors: high-sensitivity thermal sensing and deep-tissue NIR bio-imaging

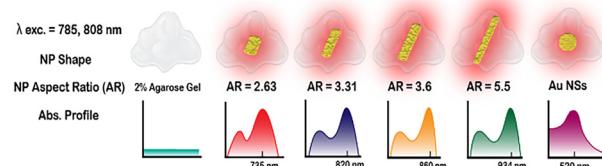
Ikhlas Kachou, Kamel Saidi, Zein El Abidine Aly Taleb, Christian Hernández-Álvarez, Mohamed Dammak\* and Inocencio R. Martín



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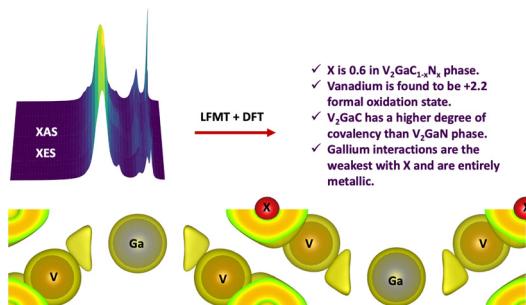
## Plasmonic enhancement of photothermal conversion in hydrogels using gold nanorods

Mai S. Rashwan, Md. Masud Alam, Seyed Hassan Jaber, Abdel-Aziz Al-Sheikh, Anna Cristina S. Samia, Harihara Baskaran\* and Clemens Burda\*



## PAPERS

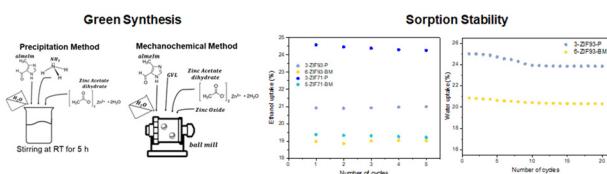
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## Bonding profiling of gapless ceramic $V_2GaC/N$ MAX phases: a spectroscopic and dual theoretical approach

Peter Ufondu,\* Sakshi,\* Teak D. Boyko, Niels Kubitzka, Christina S. Birkel and Alexander Moewes

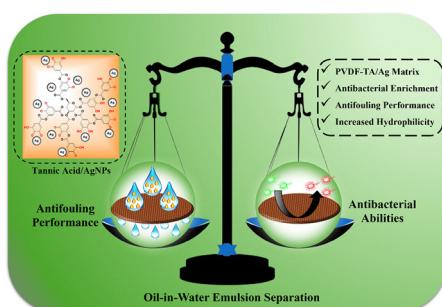
5576



## Unveiling the impact of synthesis routes on water and ethanol sorption performance of ZIF-71 and ZIF-93

Ciara Byrne,\* Katja Vodlan, Connor Hewson, Paul Iacomi, Amalija Golobić and Nataša Zubukovec Logar

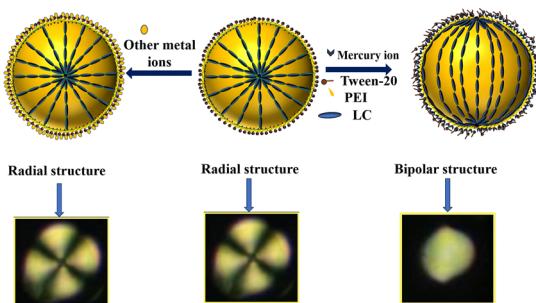
5588



## Dual-functional tannic acid-infused AgNPs-PVDF membranes via coagulation methods: an integrated study on antibacterial and antifouling performances for oil-in-water separation

Irshad Kammakakam,\* Ishfaq Showket Mir, Nadeem Baig,\* Ali Riaz and Younés Messaddeq

5605



## Rapid detection of mercury ions in water using functionalized liquid crystal microdroplets

Saumya Ranjan Pradhan, Krishnakar Chithari, Ramadevi Suguru Pathinti and Jayalakshmi Vallamkondu\*

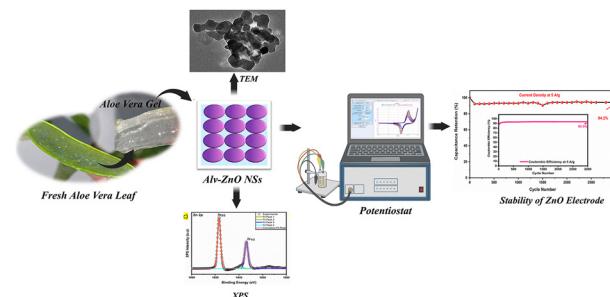


## PAPERS

5618

## Structural, optical, surface chemical, and electrochemical characterization of Aloe vera-assisted ZnO nanostructures for supercapattery applications

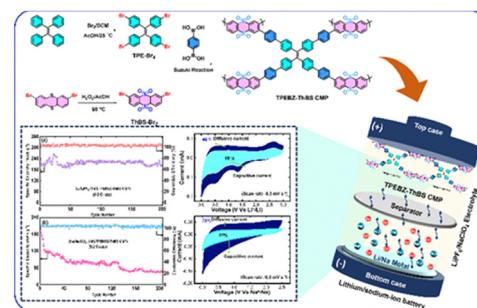
Mohit Bhatt,\* Kajal Gautam, Akarsh Verma and A. K. Sinha\*



5633

## Synergistic bifunctional conjugated microporous polymer as an organic anode containing tetraphenylethene and thianthrene-5,5',10,10'-tetraoxide units for lithium and sodium-ion batteries

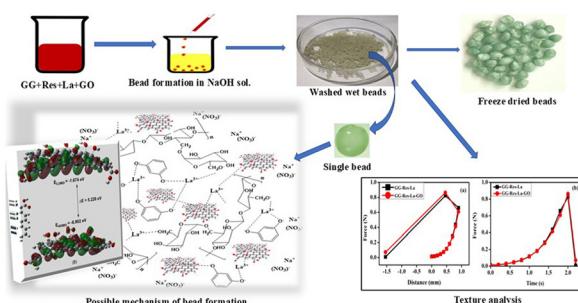
Bhargabi Halder, Mohamed Gamal Mohamed,\* Kannadasan Kalidoss, Ahmed A. K. Mohammed, Poonam Nagendra Singh, Tapomay Mondal, Yunsheng Ye, Perumal Elumalai\* and Shiao-Wei Kuo\*



5648

## Design and DFT-based optimization of a GO-containing guar gum hydrogel for dye removal

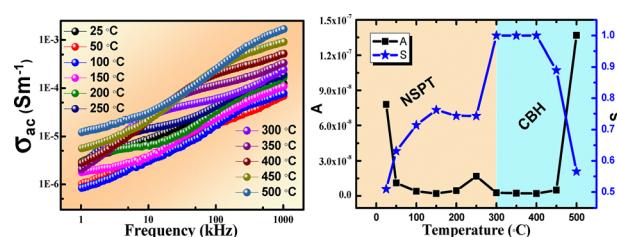
Reyaz Ahmad Rather, Jan Mohammad Mir, Mushtaq Ahmad Bhat and Aabid Hussain Shalla\*



5667

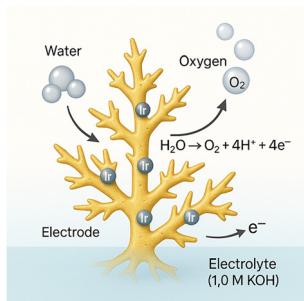
## Unveiling the electrical and energy storage performance of SrBi<sub>4</sub>Ti<sub>4</sub>O<sub>15</sub> for device applications

Rojalin Panda,\* Sudhansu Sekhar Hota, Debasish Panda and Ram Naresh Prasad Choudhary



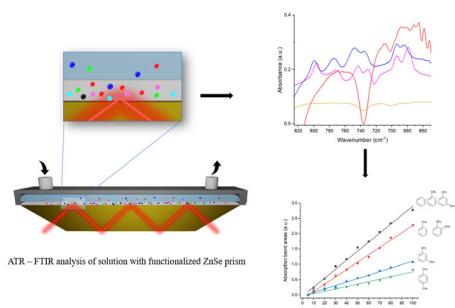
## PAPERS

5677


**Surface-engineered Ir/Au dendritic catalysts with minimal iridium loading for efficient alkaline oxygen evolution**

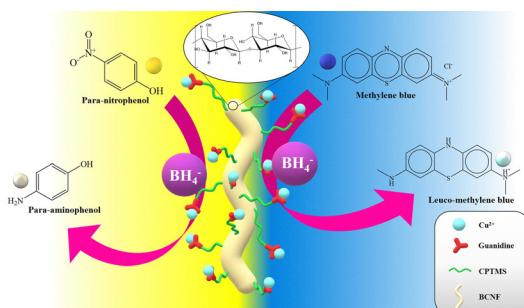
Chih-En Tsai, Yi-Ting Wang and Ying-Huang Lai\*

5687


**Mid-Infrared monitoring of aromatic hydrocarbons in an aquatic environment based on polyhydroxyalkanoate biopolymers for use in a chalcogenide infrared microsensor**

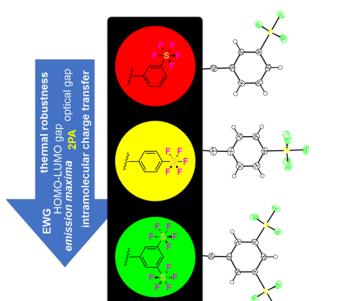
Martin Vrážel, Duc Trung Tran, Patrick Loulergue, Anthony Szymczyk, Radwan Chahal, Anthony Courtois, Marek Bouška, Joel Charrier, Petr Němec and Virginie Nazabal\*

5701


**Fabrication and catalytic efficiency of functionalized bacterial cellulose nanofibers for the reduction of 4-nitrophenol and methylene blue**

Niloofar Salimi-Turkamani, Mohamadmahdi Moghadari, Hossein Ghafuri\* and Haniyeh Dogari

5713


**Selective employment of electronic effects of the pentafluorosulfanyl group across linear and tripodal push-pull chromophores with two-photon absorption**

Michaela Fecková, Milan Klikar, Chrisovalantou Vourdaki, Ioannis Georgoulis, Oldřich Pytela, Sylvain Achelle, Zdeňka Růžičková, Mihalis Fakis,\* Petr Beier and Filip Bureš\*

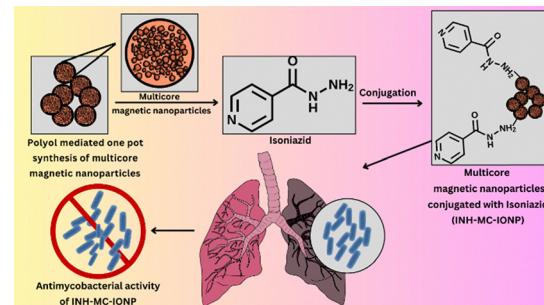


## PAPERS

5726

## Isoniazid-loaded multicore magnetic nanoparticles as a facile intervention for combating mycobacterial infection

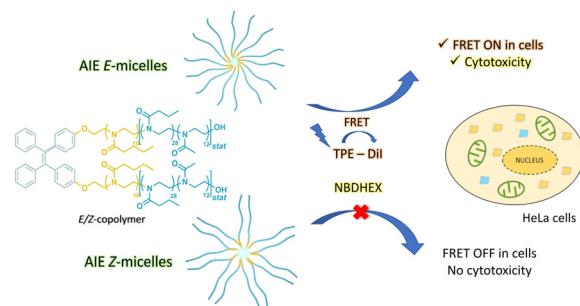
Lipsa Leena Panigrahi, Ashirbad Sarangi, Bhabani Shankar Das, Shashank Shekhar, Debapriya Bhattacharya and Manoranjan Arakha\*



5742

## Micelles based on a poly(2-oxazoline) triblock copolymer containing a pure stereoisomer *E* or *Z*-tetraphenylethylene core for theranostic applications

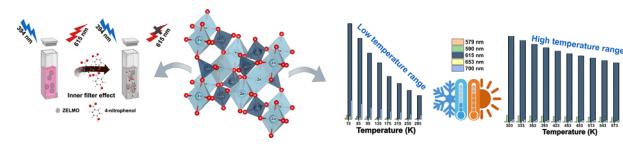
Stéphane Hoang, Guillaume Pinna, Marie Vandamme, Magali Allain, Catherine Passirani, Patrick Saulnier and Oksana Krupka\*



5758

## Thermally stable Li<sup>+</sup> co-doped ZnMoO<sub>4</sub>:Eu<sup>3+</sup> phosphors for white LEDs, nitroaromatic sensing and low temperature non-contact optical thermometry applications

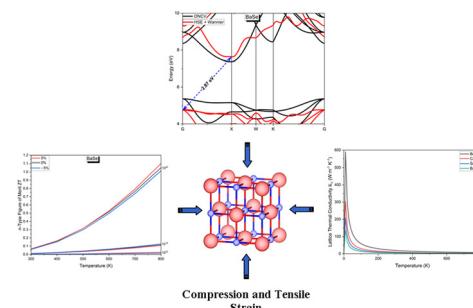
Astha Tyagi, M. Rakshita, D. Haranath and Chikkadasappa Shivakumara\*



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## Advanced study of the electronic and thermoelectric properties of AEMSe compounds under compression and tensile strain

Hiren S. Patel, Vishnu A. Dabhi and Aditya M. Vora\*



## CORRECTION

5792

**Correction: Environmental materials: CO<sub>2</sub>-adsorbing clays for enhancing soil fertility and agricultural sustainability**

Faizah Altaf, Shakeel Ahmed, Shahid Ali, Muhammad Mansha and Safyan Akram Khan\*

